Electronic Design Data Description for Printed Boards in Digital Form
# Table of Contents

1.0 SCOPE .......................................................................................... 1
   1.1 Format Compatibility ................................................................. 1

2.0 APPLICABLE DOCUMENTS .......................................................... 1
   2.1 IPC ............................................................................................. 1
   2.2 American National Standards Institute ...................................... 1
   2.3 Department of Defense ............................................................... 2

3.0 TERMS AND DEFINITIONS .......................................................... 2
   3.1 Annotation ................................................................................ 2
   3.2 Comment Records ................................................................. 2
   3.3 Complex or Composite Records .............................................. 2
   3.4 Component Electrical Description Record .............................. 2
   3.5 Component/Pin Location Records ........................................... 2
   3.6 Data Information Module (DIM) ............................................. 2
   3.7 Data Layer ............................................................................... 2
   3.8 Design Electrical Description Record .................................... 2
   3.9 Job Set .................................................................................... 2
   3.10 Modal Form ........................................................................... 2
   3.11 Parameter Record .................................................................. 2
   3.12 Subroutine ............................................................................ 2
   3.13 Subroutine Call ..................................................................... 2

4.0 GENERAL REQUIREMENTS .......................................................... 2
   4.1 Data Hierarchy ......................................................................... 2
   4.2 Basic Record Types ............................................................... 2
   4.3 Data Set Descriptions ............................................................ 2
   4.4 Data Orientation ...................................................................... 2
   4.5 Transfer Media and Data Formats .......................................... 2

5.0 PARAMETER RECORDS .............................................................. 5
   5.1 Parameter—JOB ....................................................................... 5
   5.2 Parameter—DIM ...................................................................... 5
   5.3 Parameter—UNITS ................................................................. 5
   5.4 Parameter—TITLE ................................................................. 5
   5.5 Parameter—NUM .................................................................... 5
   5.6 Parameter—REV ...................................................................... 5
   5.7 Parameter—DESRL ................................................................. 5
   5.8 Parameter—NNAME ............................................................... 9
   5.9 Parameter—PNAME ............................................................... 9
   5.10 Parameter—LNAME ............................................................. 10
   5.11 Parameter—RDES ............................................................... 10

6.0 COMMENT RECORDS .................................................................. 10

7.0 COMPONENT ELECTRICAL DESCRIPTION RECORD ...................... 10
   7.1 General Information ............................................................... 10
   7.2 Operations Code Description .............................................. 11
   7.3 Subgroups Within the Component Feature Description Area .... 11
   7.4 Subgroups Within the Element Pin Correlation Field ............ 13

8.0 DESIGN ELECTRICAL DESCRIPTION RECORD ............................... 13
   8.1 General Description ............................................................... 13
   8.2 Operations Code Description Area ..................................... 13
   8.3 Design Feature Description Area ......................................... 13
   8.4 Subgroups Within the Node to Pin Correlation Data ............ 14

9.0 COMPONENT/ELEMENT LOCATION RECORD .................................... 14
   9.1 General Information ............................................................... 14
   9.2 Operations Code Description Area ..................................... 14
   9.3 Subgroups of the Description Area ..................................... 15
   9.4 Subgroups Within the Location Description Area .............. 15

10.0 MISCELLANEOUS RECORD FORMATS ............................................ 16
   10.1 General Information ............................................................. 16
   10.2 Component Description .......................................................... 16
   10.3 Symbol Description ............................................................... 16
   10.4 Conductor Description .......................................................... 16
   10.5 Electrical Descriptions .......................................................... 16

APPENDIX ......................................................................................... 17
Electronic Design Data Description for Printed Boards

1.0 SCOPE

The information contained in this standard is intended to describe the relationship between the elements used in the electromechanical design and packaging of electronic products using printed boards as the major form of interconnection. Included in these descriptions are the logical and physical elements necessary as input to a design system, as well as the network or interconnection description between the various electronic parts. It is further intended that this structure provides the capability for describing all elements in their final form upon design completion.

The logical and physical elements used in the electronic design process shall be described in digital form in order to enable the data exchange and archiving capability between systems which support design, manufacture, assembly, and test.

1.1 Format Compatibility

The concepts detailed in this standard are supplemented by the descriptions defined in other companion IPC standards. It is the intent that the family of IPC-D-35X standards detail the various record formats.

Data redundancy is kept to a minimum by using various standards for appropriate data descriptions dependent upon the use of the data.

The following shows the correlation between the IPC standard and the record formats that are defined in each particular standard.

<table>
<thead>
<tr>
<th>IPC-D-35X Standards</th>
<th>Record Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPC-D-350</td>
<td>Artwork Records</td>
</tr>
<tr>
<td>IPC-D-350</td>
<td>Board Description Records</td>
</tr>
<tr>
<td>IPC-D-351</td>
<td>Schematic Drawing Records</td>
</tr>
<tr>
<td>IPC-D-351</td>
<td>Master Drawing Records</td>
</tr>
<tr>
<td>IPC-D-351</td>
<td>Assembly Drawing Records</td>
</tr>
<tr>
<td>IPC-D-351</td>
<td>Miscellaneous Part Drawing Records</td>
</tr>
<tr>
<td>IPC-D-352</td>
<td>Electrical Description Records</td>
</tr>
<tr>
<td>IPC-D-352</td>
<td>Bill of Material Records</td>
</tr>
<tr>
<td>IPC-D-353</td>
<td>Testing Format Records</td>
</tr>
<tr>
<td>IPC-D-354</td>
<td>Library Description Records</td>
</tr>
</tbody>
</table>

The electronic design description for a single design may contain different information at various points in the design cycle. Initially, board description records may contain only board outline and blocked area information; part description information in either library records or miscellaneous part drawing records; electrical description records describe the electrical associativity of the parts.

Once a design is completed, board description records are supplemented with conductor routing information, hole information, and other data necessary to fabricate printed wiring boards. The data base can be added to as necessary in order to provide reference designator information for schematic drawing records, or any other data necessary for the intent of the user’s data base.

Users are encouraged to maintain data in a form that is self-sufficient, and is not impacted by changes in supplementary data used in the design process. Thus, library description records may be repeated on archived data. All records shall be in the appropriate format defined in the IPC standard related to the particular record type.

2.0 APPLICABLE DOCUMENTS

The following documents, of the issue currently in effect, form a part of this standard to the extent specified herein.

2.1 IPC

<table>
<thead>
<tr>
<th>IPC-T-50</th>
<th>Terms and Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPC-D-300</td>
<td>Printed Board Dimensions and Tolerances</td>
</tr>
<tr>
<td>IPC-D-310</td>
<td>Suggested Guidelines for Artwork Generation and Measurement Techniques for Printed Circuits</td>
</tr>
<tr>
<td>IPC-D-325</td>
<td>Printed Board Documentation</td>
</tr>
<tr>
<td>IPC-D-350</td>
<td>Printed Board Description in Digital Form</td>
</tr>
<tr>
<td>IPC-D-351</td>
<td>Printed Board Drawings in Digital Form</td>
</tr>
<tr>
<td>IPC-D-353</td>
<td>Automatic Test Information Description in Digital Form</td>
</tr>
<tr>
<td>IPC-D-354</td>
<td>Library Format Description for Printed Board Digital Data Bases</td>
</tr>
</tbody>
</table>

2.2 American National Standards Institute

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSI X3.12</td>
<td>Subroutine Record Format Standardization</td>
</tr>
</tbody>
</table>

---

1. Publications are available from the IPC, 2215 Sanders Road, Northbrook, IL, 60062-6135
2. To obtain documents, write: American National Standards Institute, 1430 Broadway, New York, NY 10018